ISSN 1028-334X, Doklady Earth Sciences, 2018, Vol. 480, Part 2, pp. 710–714. © Pleiades Publishing, Ltd., 2018.
Original Russian Text © L.B. Nazarova, D.A. Subetto, L.S. Syrykh, I.M. Grekov, P.A. Leontev, 2018, published in Doklady Akademii Nauk, 2018, Vol. 480, No. 5, pp. 568–572.

GEOLOGY

Reconstructions of Paleoecological and Paleoclimatic Conditions of the Late Pleistocene and Holocene according to the Results of Chironomid Analysis of Sediments from Medvedevskoe Lake (Karelian Isthmus)

L. B. Nazarova[a, b, **], D. A. Subetto[c, d], L. S. Syrykh [b, d, *], I. M. Grekov[d], and P. A. Leontev[d]

Presented by Academician A.P. Lisitsyn October 19, 2015

Received February 21, 2018

Abstract—The use of chironomids (Diptera: Chironomidae) as indicators of changes in natural and climatic settings allows one to reconstruct paleoclimatic and paleoenvironmental conditions. Based on the results of lithological and chironomid analyses, the loss on ignition (LOI) values, as well as the results of radiocarbon dating (^{14}C AMS), new data on the paleoclimate in the Karelian Isthmus, in particular the quantitative reconstruction of the mean July temperature (T_{July}, °C) in the Late Pleistocene and Holocene and the evolution of the ecosystem of Medvedevskoe Lake have been obtained.

DOI: 10.1134/S1028334X18060144

Climatic processes during the Late Pleistocene–Holocene transition in the area of the Karelian Isthmus have been previously studied in detail [1–5]; however, data on the paleoclimate in the Holocene in this region are scarce [6].

Deglaciation of the Karelian Isthmus occurred during the retreat of glaciers at the Luga and Neva stages of the Upper Valdai Glacial [4]. The central part of the Karelian Isthmus became open from ice before 13.6 ka and represented a hill (nunatak) above the glacier surface with small inland lakes [1], the study of which is of particular importance, since they are characterized most likely by continuous sedimentation in comparison with other areas of the Isthmus, which were repeatedly flooded by the waters of the Baltic Sea and Lake Ladoga [1].

[a] *Potsdam University, Institute of Earth and Environmental Science, Potsdam, Germany*
[b] *Kazan Federal University, Kazan, 420008 Russia*
[c] *Northern Water Problems Institute, Karelian Science Center, Russian Academy of Sciences, Petrozavodsk, Republic of Karelia, 185003 Russia*
[d] *Herzen Russian State Pedagogical University, St. Petersburg, 191186 Russia*
**e-mail: lyudmilalsd@gmail.com*
***e-mail: Larisa.nazarova@awi.de*

Our study aimed to reconstruct the paleoecological and paleoclimatic conditions in the Karelian Isthmus during the Late Pleistocene and Holocene based on the data on the organic matter content and the results of biological analysis of bottom sediments from Medvedevskoe Lake. Chironomids (Diptera: Chironomidae) and statistical models based on extensive databases on ecological parameters and the taxonomic composition of chironomids of lakes of Northern Russia were used as an indicator group [7, 8].

In the spring periods of 2012 and 2014, two cores of bottom sediments (BS) were collected on Medvedevskoe Lake (60°31′51″ N, 29°53′57″ E, 102.2 m a. s. l., an area of 0.44 km^2, maximum depth of 4 m) (Fig. 1). The samples of sediments were analyzed using the loss on ignition (LOI) method to estimate the organic matter and carbonate content in lacustrine sediments (LOI, %) [9] and were dated using accelerator mass-spectrometry (^{14}C AMS). According to the radiocarbon data analysis and the LOI values, a BS composite column was compiled.

Chironomid analysis was performed following the standard procedure [10]. Reconstruction of the paleoecological conditions and the mean July air temperature (T_{July}) was performed using the Northern Russian chironomid-based data set and inference models [11]. Percentage stratigraphic diagram was made in C2 version 1.5 [12]. Cluster analysis and the principal com-